

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named Inventor	: Jimmy TzeMing Pang et al.	Appeal No.
Appln. No.	: 10/824,861	Group Art Unit: 2627
Filed	: April 15, 2004	Examiner: D. E. Mercedes
For	: ADAPTIVE RECORDING BAND EXPANSION METHODOLOGY	
Docket No.	: S104.12-0056/STL 11441	

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## BRIEF FOR APPELLANTS

*FILED ELECTRONICALLY JUNE 5, 2007*

Sir:

This is an Appeal from a Final Office Action dated August 30, 2006 and the Advisory Action dated January 29, 2007 in which independent claim 24 was finally rejected, and dependent claims 25 and 26 were objected to. The appellants respectfully submit that claim 24 is allowable, and request that the Board reverse the rejection of claim 24 and find that claims 24-26 are in condition for allowance.

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### **REAL PARTY IN INTEREST**

Seagate Technology LLC, a corporation organized under the laws of the state of Delaware, and having offices at 920 Disc Drive, Scotts Valley, California, 95066 has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as set forth in the Assignment filed with the patent application and recorded on Reel 015229, frame 0413.

### **NO RELATED APPEALS OR INTERFERENCES**

There are no known related appeals or interferences that will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

### **STATUS OF THE CLAIMS**

- I. Total number of claims in the application.
  - Claims in the application are: 1, 8-15, 18-20 and 24-26
- II. Status of all the claims.
  - A. Claims cancelled: 2-7, 16-17 and 21-23
  - B. Claims withdrawn but not cancelled:
  - C. Claims pending: 1, 8-15, 18-20 and 24-26
  - D. Claims allowed: 1, 8-15 and 18-20
  - E. Claims rejected: 24
  - F. Claims objected to: 25 and 26
- III. Claims on appeal
  - The claims on appeal are: 24-26

### **STATUS OF AMENDMENTS**

An Amendment After Final was filed on December 21, 2006 and has been acted on by the Examiner. In an Advisory Action mailed on January 29, 2007, the Amendment After Final was entered by the Examiner for purposes of appeal. That Advisory Action allowed previously rejected

claims 1, 8-15 and 18-20, but rejected new claim 24 and objected to new claims 25-26. For purposes of this appeal, the rejection of claim 24 in the Advisory Action is considered to be a final rejection.

### **SUMMARY OF CLAIMED SUBJECT MATTER**

#### **1. Introduction**

The claimed subject matter relates to methods which result in increases in storage provided by data storage media. In particular, the claimed subject matter pertains to methods in which the recording band of data storage media is expanded.

#### **2. Brief Background**

One type of mass storage device is a disc drive data storage system. Disc drive data storage systems include, for example, one or more magnetic or optical storage discs. Each disc surface has an associated head slider (or "head") which includes a transducer for reading data from the disc surface. Data is stored on the disc surface in circular, concentric data tracks. A "cylinder" is the set of tracks (one per each disc surface) which have the same radius from the central axis.

The ever-increasing demand for storage capacity has driven significant increases in areal density growth rate. High recording densities are possible only if adequate signal-to-noise ratios (SNR) are achievable. Techniques for increasing storage capacity are always needed. This is particularly true for techniques which do not necessarily require higher recording densities (which potentially impact SNR) to achieve the increase in storage capacity.

#### **3. The Claimed Subject Matter**

Independent claim 24 is directed to a method. The method includes the step (305) of identifying a last usable track (215) on a recording media surface (205), beyond a default maximum track (210), as a function of a position error signal (PES) value. The method also

includes the step (310) of defining a standoff band of tracks (220) relative to the last usable track to obtain an achieved maximum track on the surface. This method is shown particularly in FIG. 3, but is also shown with reference to FIGS. 2, 4, 5-1 and 5-2, for example. This method is described throughout the application. More general embodiment descriptions are provided for example on page 4, lines 1-10, and between page 5, line 9 and page 9, line 14. More particular embodiment descriptions are provided for example between page 9, line 15 and page 13, line 13.

### **GROUND OF REJECTION TO BE REVIEWED ON APPEAL**

1. Whether independent claim 24 is unpatentable under 35 U.S.C. §103(a) over U.S. Patent No. 6,130,796 issued to Wiseloge in view of U.S. Patent No. 6,260,257 issued to Emo et al. (hereafter referred to as “Emo”).

### **ARGUMENT**

#### **1. Claim 24 is allowable over Wiseloge in view of Emo**

In the Advisory Action dated January 29, 2007, independent claim 24 was rejected as being unpatentable over the combination of Wiseloge in view of Emo. The Examiner’s rejection is respectfully traversed, and it is respectfully requested that the Board reverse the Examiner’s rejection of independent claim 24.

#### **A. Independent Claim 24**

Independent claim 24 recites a method. The method includes the step of “identifying a last usable track on a recording media surface, beyond a default maximum track, as a function of a position error signal (PES) value”. The method also includes the step of “defining a standoff band of tracks relative to the last usable track to obtain an achieved maximum track on the surface.”

**B. Claim 24 is not obvious over a combination of Wiselogel and Emo**

In the Advisory Action, the Examiner provided a basis for rejecting independent claim

24. Specifically, the Examiner stated:

As to independent claim 24, the combination of Wiselogel (US 6,130,796) in view of Emo et al. (US 6,260,257) discloses the claimed limitations. Wiselogel discloses identifying a last usable track on a recording media surface, beyond a default maximum track, as a function of a position error signal (PES) value; and defining a standoff band of tracks relative to the last usable track to obtain an achieved maximum track on the surface. Wiselogel discloses identifying a last usable, beyond a default maximum track, track as a function of a parameter (according to Applicant's definition of an usable on page 6, lines 1-7 of instant specification, the examiner believes Wiselogel discloses a last usable track as claimed, as depicted in. Fig.4, when the actuator encounters an inner-outer diameter crash stop & as depicted in Fig.4, 201,204,102-104); and defining a standoff band of tracks relative to the last usable track to obtain an achieved maximum track on the surface (according to Applicant's definition of standoff band of tracks, page 6, lines 10-15 of instant specification, the examiner believes Wiselogel discloses a standoff band of tracks as claimed, as depicted in Fig.4, "102, 103, 104, and 203"; col.2, lines 35- 50; col. 4, lines 23-64). Wiselogel fails to particularly disclose the last usable track is identified as a function of a position error signal value. However, Emo et al. discloses such (figs.4-6, 8, 10, 15-16). Emo et al. discloses that is well known in the art to use average PES and PES for adjusting crash stops (fig.4 col. 3, lines 1-16). Therefore, it would have been obvious to of ordinary skill in the art at the time of the invention to modify the system as disclosed by Wiselogel with the disclosed teachings of Emo et al., the motivation to provide such method with the ability to detect crash stop location (last usable track) on the media, and increase the recording density of the disk drive.

While the Examiner initially states that "Wiselogel discloses identifying a last usable track . . . as a function of a position error signal (PES) value", the Examiner ultimately acknowledges that "Wiselogel fails to particularly disclose the last usable track is identified as a function of a position error signal value." Appellant agrees with the Examiner that Wiselogel fails to teach the claim limitation of "identifying a last usable track on a recording media surface, beyond a default maximum track, as a function of a position error signal (PES) value". Appellant traverses, however, the Examiner's assertion that Emo teaches this claim limitation.

Emo does not support the Examiner's interpretation of that reference as teaching the claim limitation of "identifying a last usable track on a recording media surface, beyond a default maximum track, as a function of a position error signal (PES) value". For example, referring specifically to the portion of Emo relied upon by the Examiner, Emo states:

In the prior art, servo data is written on the disks before the crash stops are placed in the drive. If the position variance of both the inner and outer crash stop is  $\sigma^2$ , then the average position lost (i.e. usable position lost for recording data) on a drive where all tracks are written before the crash stop positions are detected is  $6\sigma$ , the worst case stroke (w.c. stroke) indicated in FIG. 4A. . . .

Thus it will be appreciated that in both prior art methods since assumptions are made about the usable data area based on the above techniques, there is a loss of available position for storing information. See Emo at col 2, line 66 – col. 3, line 17.

Here, Emo describes the average position lost as being the "usable portion lost for data recording", but makes no reference to a position error signal (PES) or a PES value. In fact, Emo does not make reference to PES signals and values in general, and particularly in the context used in this claim limitation found in independent claim 24. In contrast, Emo teaches that improvement in recording density can be achieved by testing read/write frequency performance of each of the heads in a multi-head drive using bit error rate (BER) as the parameter, not PES values. See for example Emo at col. 4, lines 58 – col. 5, line 4, stating:

In the present invention, a substantial improvement in the recording density is achieved by, in one aspect, testing the read/write frequency performance of each of the heads in a multi-head drive and for those heads having a lower than acceptable bit error rate at a predetermined operating frequency reducing the read/write frequency of those heads to bring them up to an acceptable bit error rate performance level; and for heads which have a bit error rate above the acceptable bit error rate at the predetermined operating frequency increasing their read/write frequency by an amount sufficient to make up for the loss of recording density on the head(s) for which the read/write frequency was reduced, but not so much as to fall below the minimum acceptable bit error rate.

While Emo describes using BER to improve recording density, this reference does not teach the claim limitation of claim 24 of “identifying a last usable track on a recording media surface, beyond a default maximum track, as a function of a position error signal (PES) value”. In view of this fact, and in view of the fact that the Examiner has admitted that Wiseloge fails to disclose this limitation, the cited combination cannot render independent claim 24 obvious, and claims 24-26 are believed to be in condition for allowance.

Applicants respectfully request that the rejection of independent claim 24 therefore be reversed by the Board, and that the Board find claims 24-26 to be in condition for allowance. The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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**Appendix A: Claims On Appeal**

24. A method comprising:  
identifying a last usable track on a recording media surface, beyond a default maximum track, as a function of a position error signal (PES) value; and  
defining a standoff band of tracks relative to the last usable track to obtain an achieved maximum track on the surface.
25. The method of claim 24, wherein identifying the last usable track as a function of the PES value further comprises identifying the last usable track as a function of when the PES value exceeds a predetermined percentage of an average PES value.
26. The method of claim 24, wherein identifying the last usable track as a function of the PES value further comprises identifying the last usable track as a function of when a track PES exceeds a predetermined percentage of a maximum budgeted PES.

**Appendix B: Evidence Appendix**

There is no known evidence submitted pursuant to 37 CFR §§ 1.130, 1.131 or 1.132 or other evidence entered by the Examiner.

**Appendix C: Related Proceedings Appendix**

There are no known related appeals or interferences regarding the present appeal.